

RED HILL UNDERGROUND STORAGE TANK FACILITY

STATUS UPDATE – FEBRUARY 2016

Background

Administrative Order on Consent

On September 28, 2015, the Hawaii Department of Health (HDOH) and the U.S. Environmental Protection Agency (EPA) – (Regulatory Agencies) - finalized an enforceable Administrative Order on Consent (AOC) with the U.S. Navy and Defense Logistics Agency (DLA). The AOC requires Navy and DLA to implement numerous activities to address fuel releases and implement infrastructure improvements to protect human health and the environment.

The required work is outlined in a Statement of Work (SOW) that covers eight areas; Project Planning and Management; Tank Inspection, Repair, and Maintenance Procedures; Tank Upgrade Alternatives; Release Detection / Tank Tightness Testing; Corrosion and Metal Fatigue Practices; Investigation and Remediation of Releases; Groundwater Protection and Evaluation; and Risk / Vulnerability Assessment.

Several project documents are now available on the Regulatory Agencies websites at _____ and _____. Periodic updates will also be provided to the public via email, website updates, and public meetings.

Significant progress made during week long scoping meetings

From November 30th to December 4th at Pearl Harbor, the Regulatory Agencies, their technical experts, the Navy and Defense Logistics Agency, Naval contractors, and representatives from the Hawaii State Department of Land and Natural Resources met for scoping meetings on the SOW.

Draft reports for the Release Detection/Tank Tightness Testing and the Corrosion and Metal Fatigue Practices are due in April. The draft scopes of work for the Investigation and Remediation of Releases and Groundwater Protection and Evaluation are due in May. Scoping work for Tank Inspection, Repair, and Maintenance Procedures and Tank Upgrade Alternatives is expected to be completed by March, and the scoping for the Risk / Vulnerability Assessment is due in April.

Environmental Assessments

Drinking water and groundwater monitoring continue to indicate drinking water is safe

Public water systems that supply drinking water to Oahu residents are required to routinely test drinking water for contaminants. All drinking water supplies in the vicinity of Red Hill continue to meet all federal drinking water standards, known as Maximum Contaminant Levels (MCLs).

The Navy has been regularly testing the groundwater at the Red Hill Facility since 2005. There are no standards or MCLs set for contaminants in groundwater, rather the State of Hawaii has established Environmental Action Levels (EALs) and in some cases, Site Specific Risk Based Levels (SSRBLs) for certain monitoring locations.

Samples of groundwater taken at the ten monitoring locations at and around the Red Hill Facility have rarely exceeded the state EALs or SSRBLs. For example, the groundwater monitoring well near Red Hill Tank #5 (well RHMW02) has exceeded SSRBLs only three times over 46 quarters of sampling since 2005 (10/22/2008, 1/15/2014, and 4/20/2015).

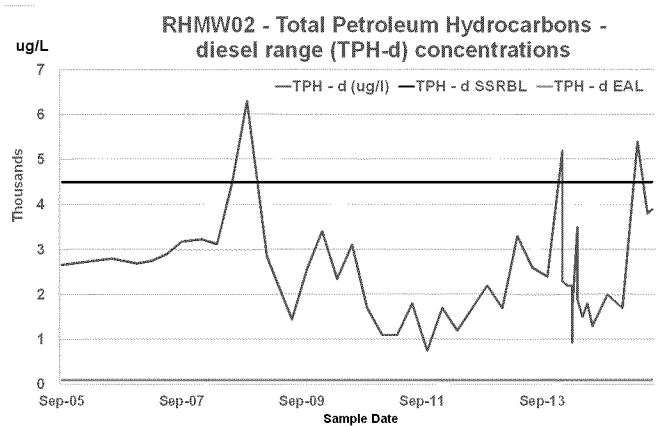


Figure 1 – TPH-diesel concentrations at Monitoring well #2 (RHMW02), 2005 - 2014

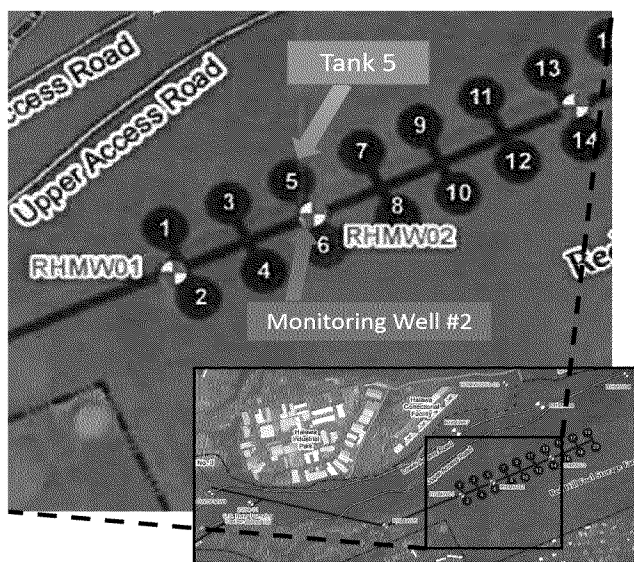


Figure 2 - Location of Tank 5 and Monitoring Well #2 (RHMW02)

Approximately 3,000 feet down gradient from the tanks is the drinking water supply well nearest to the Red Hill Facility (well RHMW2254-01). Samples from this well are evaluated against MCLs and EALs. This well has always met all MCL standards, and since quarterly sampling began in 2005, this well had detected concentrations of Total Petroleum Hydrocarbons – diesel range (TPH-d) in only seven samples, all below the EAL of 100 ug/L.

More detailed information on groundwater monitoring results can be found at www.epa.gov/red-hill. Information on the Navy's drinking water testing can found [here](http://navfac.navy.mil/content/dam/navfac/NAVFAC%20Pacific/NAVFAC%20Hawaii/PDFs/Reports/hi_) (http://navfac.navy.mil/content/dam/navfac/NAVFAC%20Pacific/NAVFAC%20Hawaii/PDFs/Reports/hi_

2015_jbphh_wqrpt_final_27May15.pdf), and information on Honolulu Board of Water Supply drinking water testing can be found [here](http://www.boardofwatersupply.com/cssweb/display.cfm?sid=1081) (http://www.boardofwatersupply.com/cssweb/display.cfm?sid=1081).

Agreement reached on the location for the next four new groundwater monitoring wells

New groundwater monitoring wells to the north, west, and south of the tanks at the Red Hill Facility are planned to be installed beginning in 2016. These new wells will supply additional data to identify the presence of contamination, better characterize groundwater flow, and guide future investigations. The new wells will be sampled for the same compounds and at the same frequency (quarterly) as the existing wells. The need for additional groundwater monitoring wells in addition to the new locations will be assessed after the new wells undergo two rounds of sampling.

There are currently ten monitoring locations, three directly under the tanks. The existing wells and new groundwater wells will enhance the ability to assess whether any existing contamination under the facility is moving away from the Red Hill tanks and towards drinking water supplies. The nearest drinking water well is located about ½ mile west of the tanks and operated by the Navy.

Better understanding of Red Hill geology and groundwater flow a top priority

The flow patterns of subsurface groundwater and understanding the geology of the area is critical to investigating contamination at the Red Hill Facility. Although the Navy has performed previous investigations, improving and updating our understanding of the regional geology is a critical need to support future decisions at Red Hill and this work will be an early priority.

Further investigations will be done to improve upon the accuracy of past Navy subsurface groundwater models that will support future decisions at Red Hill. A more complete investigation of the geology is needed before considering drilling work to locate any liquid fuel that may still be under and adjacent to the Red Hill Tanks. While some may believe the Navy should begin immediately drilling to attempt to find and remove fuel, without a better understanding of the area's complex geology, an unintended consequence of such drilling may be the creation of pathways that speed the flow of contaminants into the groundwater.

The results of these studies will be used to model groundwater flow and the potential movement of contaminants. These models will aid in decision made on the feasibility and necessity of recovering any leaked fuel. At this time there is no indication that contamination from Red Hill tanks has migrated significantly towards any drinking water supplies.

Tank Improvements

Fifteen Tank upgrade alternatives evaluated. Six options will undergo in-depth study

Navy presented a preliminary study of tank upgrade alternatives and 15 alternative were identified for evaluation. Ten of the 15 alternatives were double containment systems and the remaining five were single containment systems.

After extensive discussions, six options were identified for in-depth study. The alternatives to be studied include: modifications to the current configuration, the current configuration plus coatings, complete replacement of the existing steel plates, construction of a new tank inside the existing tank, and construction of a double walled tank without an accessible outer wall using regular steel or stainless

steel. Additionally, an upgrade to piping in the lower tank nozzle is being evaluated.

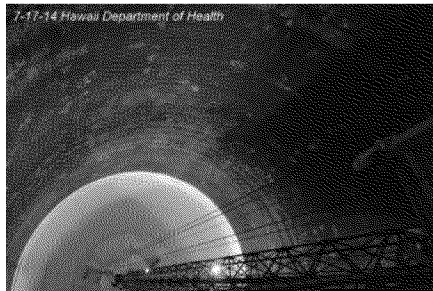


Figure 3- Inside of Tank 5

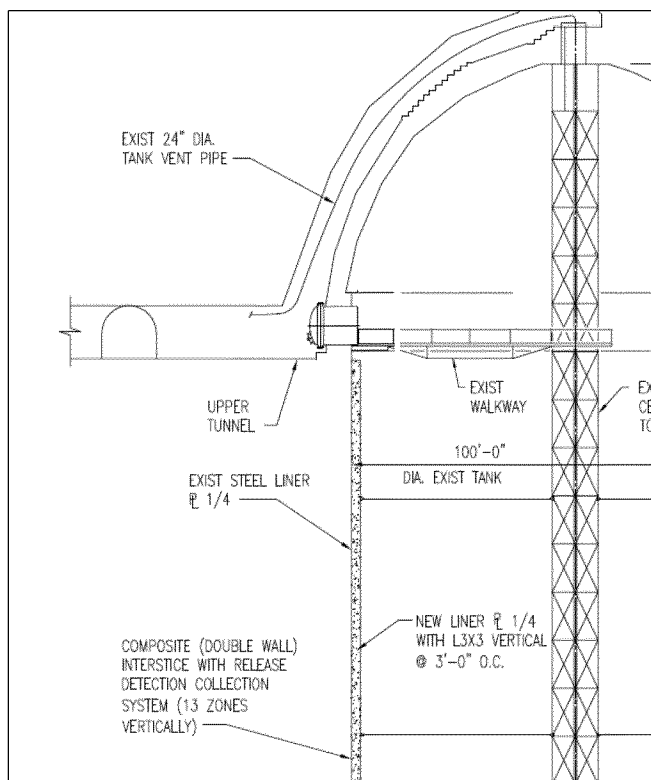


Figure 4- Composite Tank Concept

The studies will also evaluate the unique engineering systems needed with each tank upgrade alternative to prevent leaks and ensure proper performance. These systems can be as important as or even more important than the infrastructure installed.

Navy making extensive changes to Quality Assurance procedures since Tank 5 release

The Navy is beginning to develop new technical specifications for tank inspection and repair operations, and is changing its contracting procedures to improve quality assurance. Additional funding is being sought to increase Navy oversight of contractor work. The Regulatory Agencies are also consulting with experts to further improve the Navy's tank inspection, maintenance, and repair processes for both the current tank design and any future tank improvements.

The actions are a result of what is believed to be the primary contributor to the fuel release from Tank 5 - issues with the tank inspection and repair work and associated quality assurance procedures. In particular, a lack of independent review to verify the work performed by Navy contractors in Tank 5.

Individual welds inside Tank 5 were not independently inspected. Procedures related to project-wide weld technique and specifications were not adequately reviewed by independent experts, and contractor employee compliance with their own quality control procedures was not verified.

The other six tanks that underwent a maintenance procedure similar to Tank 5 did not experience problems because the work was done by a different contractor. Repair records from the six other tanks are being reviewed to better understand the different procedures employed.

Navy's infrastructure improvements proceeding

Several immediate infrastructure improvements are underway and others will undergo further evaluation. Already underway are the addition of containment doors to halt fuel movement in the event of a catastrophic equipment failure, new fire suppression systems, and enhanced quality control procedures. The Navy will continue to evaluate improvement options and provide recommendations to the Regulatory Agencies this spring.

Expertise

Regulatory Agency outside experts

Red Hill presents many unique challenges that require specialized expertise. To meet these challenges, the Regulatory Agencies assembled the following team of outside experts to support the oversight of work to be performed by the Navy and DLA.

Donald Bussey is a hydrogeologist with over 30 years of experience working on projects in geologic settings similar to Red Hill. Don is an U.S. EPA employee with the Office of Land and Environmental Management's Emergency Response Team in Las Vegas, NV.

Philip Myers of PEMY Consulting, LLC is a Chemical Engineer formerly with Chevron. Phil has decades of experience in the design, operation, and maintenance of large fuel storage facilities. He helped to develop many of the industry standards currently used worldwide to ensure the integrity of fuel storage vessels.

Douglas Schwarm is the Chief Engineer of Atlas Geotechnical. Doug has experience with the design and construction of large-scale industrial projects in the oil and gas industry around the world.

Don Thomas is a Geochemist with the University of Hawaii and currently serves as Director of the Center for the Study of Active Volcanoes in Hilo. Don's over 40 years of experience studying Hawaii geology will be invaluable in understand groundwater flow in the area around Red Hill.

Navy to expand team of experts for a Risk and Vulnerability Assessment

The Navy will hire additional experts for developing a risk and vulnerability assessment required for the Red Hill Facility.

Unlike a typical environmental risk assessment, which usually only evaluates health risks posed by contaminants in the environment, the Red Hill Risk and Vulnerability assessment will also evaluate the probabilities of various scenarios that may release fuel into the surrounding environment such as human error, mechanical failures, fires, or seismic events. The assessment will evaluate the likelihood of releases from each scenario and their consequences. The assessment will provide important information to aid decision making on modeling movement of contaminants and tank upgrades.

Next Steps

Key new work planned for the next 90 days

The Navy and DLA are on schedule to submit several key deliverables and reports for Regulatory Agency review in the next three months. This includes the Current Fuel Release Monitoring Systems Report and the Corrosion and Metal Fatigue Practices Report as well as contracting scopes of work for investigation and remediation of releases and groundwater protection and evaluation. Other work products related to the tank infrastructure will follow soon after.

Further Information

[EPA Red Hill Website](#)

[HDOH Red Hill Website](#)

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